

**UNITED STATES DISTRICT COURT FOR THE
WESTERN DISTRICT OF NORTH CAROLINA
CHARLOTTE DIVISION
3:07cv153-RJC-DCK**

REMEDICATION PRODUCTS, INC.,

Plaintiff,

v.

**ADVENTUS AMERICAS, INC.,
a Delaware Corporation, and
ENVIROMETAL TECHNOLOGIES,
INC., a Canadian Corporation,**

Defendants.

ORDER

THIS MATTER is before the Court on cross motions for summary judgment regarding the ‘213 patent and the related briefs (Doc. Nos. 133, 134, 143, 161, 166, 175, 180, & 200). The matter is ripe for determination. For the reasons set forth below, the Court will **DENY IN PART** the Plaintiff’s motion, and **GRANT IN PART and DENY IN PART** the Defendant’s motion.

I. BACKGROUND

The events leading to this case occurred in early 2005. Defendants Adventus Americas, Inc. and Envirometal Technologies, Inc. (“ETI”) (collectively “Adventus”), contacted Plaintiff Remediation Products, Inc. (“RPI”), in regards to licensing under U.S. Patent No. 5,266,213 (“the ‘213 patent”), entitled “Cleaning Halogenated Contaminants from Groundwater,” and U.S. Patent No. 5,534,154 (“the ‘154 patent”), entitled “System for Cleaning Contaminated Soil.” Adventus indicated it intended to enforce its rights under these two patents but was amenable to reviewing any information indicating that Plaintiff’s technology was unrelated to these patents. In July of 2005, representatives of Adventus and RPI met to discuss the matter, but they failed to reach an agreement.

In short, Adventus insisted on licensing and payment of royalties by RPI, whereas RPI insisted that its BOS 100® product does not infringe the ‘213 and ‘154 patents. Although the parties thereafter continued to correspond in an effort to reach an agreement, they were unable to resolve their differences. This lawsuit ensued.

RPI filed this action on April 6, 2007, and sought a declaratory judgment that the ‘213 and ‘154 patents are not infringed and are invalid. Adventus counterclaimed for infringement of the ‘213 and ‘154 patents and also asserted infringement of four additional patents: U.S. Patents Nos. 6,083,394; 5,480,579; 5,411,664; and 5,618,427 (collectively, the “Grace Patents”). RPI filed its reply asserting counterclaims of noninfringement and invalidity of the Grace patents. On August 12, 2009, the Court granted RPI’s Motion to Amend its Complaint to include a claim that the ‘213 patent is unenforceable because of inequitable conduct. (Doc. No. 92). RPI filed this action in the United States District Court for the Western District of North Carolina because Adventus asserted the ‘213 and ‘154 patents against RPI and an RPI customer located in Charlotte, North Carolina. The Court denied Adventus’s motion to dismiss portions of RPI’s first amended complaint on March 18, 2010.

Both RPI and Adventus have now moved for summary judgment as to the ‘213 patent and the ‘154 patent. RPI has also moved for summary judgment as to the Grace Patents. The Court addresses only the parties’ motions as to the ‘213 patent in this Order.

A. RPI’s allegedly infringing product and method

RPI produces and sells a product under the brand name BOS 100® that is used in cleaning groundwater contaminated with halogenated hydrocarbons. BOS 100® is comprised of 90 to 95% carbon and 5 to 10% elemental iron. It is made by treating granular, activated carbon with an iron

salt to impregnate the activated carbon with the iron salt. The material is then subjected to reducing conditions and heating to a very high temperature to convert the iron salt into elemental iron embedded within the activated carbon structure.

The recommended method of using BOS 100® requires mixing the product with water in an open tank to form a slurry. The open tank allows air and atmospheric oxygen into the tank. A portion of this atmospheric oxygen is dissolved into the slurry, and the activated carbon in turn adsorbs some portion of this dissolved oxygen. During this process, no attempts are made to prevent oxygen from entering the slurry or the groundwater below.

When the slurry is ready for use, holes roughly an inch in diameter are driven into the ground to a depth sufficient to reach the bottom of the contaminated plume of groundwater. The slurry is injected into the hole at specific depth intervals from the lowest level of contamination to the highest level. During each injection, the slurry radiates outwardly and horizontally from the injection point to form an irregular layer of BOS 100® based on the density and pathways of the aquifer. RPI contends each layer is vertically spaced roughly two feet from the vertically adjacent layers. Adventus contends such regular spacing does not occur. This process is then repeated at other injection points until the slurry has been injected in a grid pattern over the area of contamination to form what RPI contends is hundreds of individual, horizontal layers of BOS 100®. Adventus contends these layers overlap and come together to collectively make up a continuous wall of the product. Once the slurry is in place, the granular activated carbon adsorbs the chlorinated hydrocarbons out of the groundwater, and the impregnated elemental iron converts the chlorinated hydrocarbons into harmless compounds.

B. The ‘213 patent

The ‘213 patent names Dr. Robert W. Gillham as the inventor. The patent “relates to a procedure for cleaning groundwater . . . permeating through an aquifer, that has been contaminated with chlorinated or halogenated organic compounds such as solvents, or pesticides.” (Col. 1, ln. 5). Claims 1, 3, and 6 of the ‘213 patent are at issue in the current motions.

Claim 1 states:

1. Procedure for cleaning an halogenated organic contaminant from groundwater in an aquifer, comprising the steps, in combination,
 - of providing a body of metal;
 - of covering the body of metal in such a manner as to prevent substantially all traces of oxygen from reaching an anaerobic portion of the body of metal;
 - of providing the metal in the form of a body of particulates, cutting, or fibres, of such insistency that the body is permeable to the flow of the groundwater through the body;
 - of conducting the said contaminated groundwater from its native aquifer into and through the body of metal;
 - of so conducting the groundwater from the native aquifer into the body of metal that the groundwater substantially does not come into contact with atmospheric oxygen prior to entering the anaerobic portion of the body of metal;
 - of causing the groundwater to percolate through the said anaerobic portion, and to remain in contact with the metal therein, for a substantial period of time.

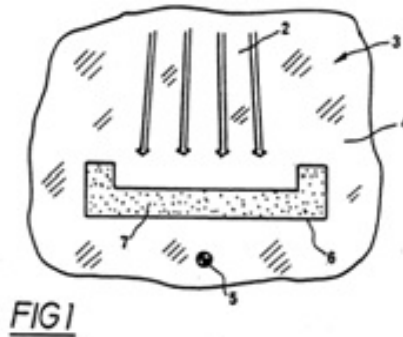
(6:52-7:6).

Claims 3 and 6 are dependent claims – they recite the “[p]rocedure of claim 1 . . . ” and then include additional limitations. Consequently, they include all of the steps and limitations set forth in Claim 1 in addition to the limitations set forth in Claims 3 and 6. Claim 3 sets forth:

3. Procedure of claim 1, further comprising the steps:
 - of excavating a trench in the material of the aquifer, in the path of the contaminated groundwater;
 - of placing the said body of metal in the trench;
 - wherein the dimensions of, and disposition of, the trench and of the said anaerobic portion are such that the contaminated groundwater passes

through the said anaerobic portion.

(7:11-19). Figure 1 of the patent illustrates the trench embodiment of Claim 3:



Claim 6 states:

6. Procedure of claim 1, further comprising the steps:
 - of providing a series of boreholes in the material of the aquifer, in the path of the contaminated groundwater;
 - of injecting metal into the boreholes;
 - wherein the spacing of the boreholes, and the quantity of metal injected, in relation to the material of the aquifer, are such that the injected metal penetrates into the material to a sufficient extent as to form the said body of metal, and the said anaerobic portion thereof.

(8:13-23). The patent does not provide an illustration of the boreholes embodiment of Claim 6.

The relevant portion of the Background states:

The conventional procedures for cleaning groundwater that has been contaminated with such chlorinated solvents have generally not involved the chemical breakdown of the contaminant, but have merely removed the contaminant from the water. For example, it is known to pass the water over activated carbon, whereby the contaminants are adsorbed onto the carbon. Whilst this is effective to clean the water, the contaminants remain on the carbon: this creates in turn another disposal problem.

(Doc. No. 1-1 at 5).

C. The prior art

The '213 patent cites three main sources of prior art that are relevant to this motion. It does not, however, disclose other related sources of prior art. The application leading to the issuance of the '213 patent claims priority from a foreign application that was filed on November 28, 1989. As a result, the critical date for determining prior art under § 102(b) is November 28, 1988. See 35 U.S.C. § 102(b) (providing that a patent or other publication is prior art if it was publicly available more than one year before the filing date of the patent application).

1. Sweeny

The '213 patent cites, and the Examiner considered, U.S. Patent No. 4,382,865 to Sweeny. As stated in the '213 patent, Sweeny described:

“[A] system for treating the effluent created during the manufacture of halogenated pesticides. Here, the effluent water stream, containing the waste material from the pesticide manufactory is passed over a combination of metals, and it is the fact of the combination which is instrumental in causing the breakdown of the halogenated contaminant.”

'213 patent, col. 1, lns. 50-57. Sweeny discloses pumping the effluent water stream through a reductant metal bed made of “at least one metal such as zinc, aluminum, iron, magnesium, [or] cadmium.” Sweeny, col. 6, lns. 15-16. According to Sweeny, a “faster . . . , more complete reaction[,] and a decomposition product in which the proportion of relatively innocuous products is increased[,] is provided by addition of from .1 to 10 meq/g of catalytic metals such as copper, silver, cobalt, nickel and the like.” Id. col. 6, lns. 16-21.

The '213 patent distinguishes its own claims from the '865 patent because Sweeny taught using a combination of metals and that “it is the fact of the combination [of metals] which is instrumental in causing the breakdown of the halogenated hydrocarbons.” (1:55-57). Further, the '213 patent distinguishes Sweeny in that Sweeny focused on above-ground factory effluents, while

the '213 patent focuses on remediating groundwater in its native aquifer, which “unlike factory effluent . . . is oxygen-free.” ‘213 patent, col. 1, lns. 58-66.

2. *Cohen*

The ‘213 patent cites, and the Examiner considered, U.S. Patent No. 5,057,227 to Cohen.¹

Cohen describes:

a method for in-situ removal of hydrocarbon contaminants from groundwater, where the contaminants are in aqueous solution with the groundwater. The method of this invention comprises contacting in-situ groundwater containing hydrocarbon contaminants in aqueous solution therewith such as gasoline and its components with a permeable barrier comprising a peat material.

Cohen, col. 3, lns. 52-59. Peat is an absorbent material, and Cohen discloses it as useful for the “removal of hydrocarbon contaminants such as gasoline and its components (e.g. benzene, toluene, and xylene) in solution from groundwater.” Id. col. 2, lns. 39-42.

In Cohen, “the permeable barrier is positioned substantially perpendicular to the groundwater stream incident thereto by means of a trench which is dug in such manner as to contact the contaminated groundwater stream in a substantially perpendicular fashion.” Id., col. 13, lns. 58-63. Cohen thus teaches the use of trenches in remediating groundwater.

3. *Fenton*

The ‘213 patent cites, and the Examiner considered, U.S. Patent No. 4,664,809 to Fenton.

Fenton describes:

the abatement of pollution in groundwaters, by drilling a series of wells in the path of an advancing front of contaminants in an aquifer, and using the wells to introduce

¹ While Cohen may not be “prior” art, it is clear from the face of the ‘213 patent that the Examiner considered Cohen in determining that the patent should issue.

into the aquifer an adsorbent for the particular contaminants present. This adsorbent can act as an in situ filtration bed, removing contaminants as water passes through.

Fenton, col. 1, lns. 48-54.

4. *Senzaki*

In 1988, a Japanese journal published an article authored by Tetuo Senzaki and Yasuo Kumagai (“Senzaki”). Senzaki & Kumagai, Removal of Organochloro Compounds in Waste water by Reductive Treatment – Treatment of 1,1,2,2 Tetrachloroethane with Iron Powder, *Kogyo Yosui* (357), 2-7 (Japan 1988). The article was printed in Japanese, with no English translation when it was published. The introduction begins:

Recently, pollution of underground water and tap-water with organochloro [chlorinated hydrocarbon] compounds have become a social problem. The major sources of the pollution are cleaning business and industries concerning technology, especially industries producing semiconductors and machines in which industries organo-chloro compounds, e.g. trichloroethylene are used although these compounds are harmful to human body.

(Doc. No. 37-1 at 2).

Senzaki discloses that iron powder degrades organochloro compounds in water where there is an absence of oxygen. Senzaki states the “[p]resence of metal (iron) is indispensable for the reaction.” (Id. at 8). Senzaki also counsels that “The reaction [between organochloro compounds and metallic iron] can be accelerated by addition of electrolytes such as sodium sulfate which increase electric conductivity when the solution containing small quantities of electrolytes, e.g. ion-exchanged water, shows low electric conductivity. (Id.). In a post-script, Senzaki notes that the “treatment method of organochloro compounds with metal still has unsolvable problems.” (Id. at 9). The source also notes that the problem of contamination exists in both waste water and groundwater.

5. *McMurtry*

David McMurtry and Richard Elton wrote an article (“McMurtry”) in 1985 dealing with methods for the in situ treatment of contaminated groundwater. McMurtry & Elton, New Approach to In-Situ Treatment of Contaminated Groundwaters, *Environmental Progress*, Vol. 4, No. 3, at 168 (August 1985). The article briefly outlined three methods of remediation for various scenarios.

McMurtry’s first method involves an in situ treatment system for cleaning groundwater of organic compounds, such as benzene. The system consists “of a low permeability slurry wall perforated with beds of granular activated carbon” Id. at 169. McMurtry refers to this wall as a “trench.” Id. at 170. McMurtry’s second method discloses treating acid waste that was spilled onto a hillside. McMurtry suggests excavating a trench at the bottom of the down slope in the path of the plume of contamination and placing limestone into the trench to neutralize the acid waste and precipitate out the heavy metals. Id. It then suggests flushing water down the hill so that the remaining contaminants will flow down through the treatment media, and then removing the treatment media from the site. Id. McMurtry’s third method involves the in situ treatment of leachate from a landfill. Here, McMurtry discloses “a slurry wall to control the plume and treatment zones composed of coarse gravel on top of a diffused air injection manifold to provide for both air stripping of the problem organics as well as possible biological removal.” Id.

McMurtry does not specifically disclose placing metal or a “body of metal” in a trench to treat groundwater contaminated with halogenated hydrocarbons. McMurtry does suggest using any “appropriate treatment media” that is capable of treating contaminated water. As the source states, “[s]uch treatment media could include activated carbon for sorption of organics, ion exchange resins to capture inorganic species, substances for pH control of solubility, media for fixed-film biological reactions enhanced by nutrients and/or oxygen supplies, or combinations of these and many other

treatment techniques.” Id. at 168.

In briefly citing the chemical characteristics of the subsurface environment , McMurtry states, “[m]ost groundwater treatment cases will be in isothermal, anaerobic, reducing environments.” Id.

6. Thomson

Bruce Thomson and Stephen Shelton wrote a paper (“Thomson”) concerning the treatment of contaminated groundwater by using permeable barriers. Bruce M. Thomson & Stephen P. Shelton, Permeable Barriers: A New Alternative for Treatment of Contaminate Ground Waters, (Nat’l Water Well Assoc. Pub. 1988). The Thomson reference discloses providing a trench or boreholes filled with treatment material in the path of a contaminated plume of groundwater to form a permeable barrier for treating contaminated water. Figure 1 of Thomson shows a trench filled with material above the groundwater level. The treatment material is permeable so that the groundwater flows slowly through it. Figure 2 from Thomson shows that a well-based permeable barrier requiring the injection of metal may be used instead of a trench-based barrier for treating deep levels of contaminated groundwater.

II. LEGAL STANDARD

Summary judgment shall be granted “if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law.” Fed. R. Civ. P. 56(c). The movant has the “initial responsibility of informing the district court of the basis for its motion, and identifying those portions of ‘the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any,’ which it believes demonstrate the absence of a genuine issue of material fact.” Celotex Corp. v. Catrett, 477

U.S. 317, 323 (1986) (quoting Fed. R. Civ. P. 56(c)).

Once this initial burden is met, the burden shifts to the nonmoving party. The nonmoving party “must set forth specific facts showing that there is a genuine issue for trial.” Id. at 322 n.3. The nonmoving party may not rely upon mere allegations or denials of allegations in his pleadings to defeat a motion for summary judgment. Id. at 324. The nonmoving party must present sufficient evidence from which “a reasonable jury could return a verdict for the nonmoving party.” Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 248 (1986); accord Sylvia Dev. Corp. v. Calvert County, Md., 48 F.3d 810, 818 (4th Cir. 1995).

When ruling on a summary judgment motion, a court must view the evidence and any inferences from the evidence in the light most favorable to the nonmoving party. Anderson, 477 U.S. at 255. “Where the Record taken as a whole could not lead a rational trier of fact to find for the nonmoving party, there is no genuine issue for trial.” Ricci v. DeStefano, 129 S. Ct. 2658, 2677, 557 U.S. ____ (2009) (quoting Matsushita v. Zenith Radio Corp., 475 U.S. 574, 587 (1986)).

III. DISCUSSION

As Mr. Justice Frankfurter once recognized, the judiciary is ill-fitted “to discharge the duties cast upon them by patent legislation.” Marconi Wireless Telegraph Co. v. United States, 320 U.S. 1, 60-61 (1943) (Frankfurter, J., dissenting). Nonetheless, he suggested that “judges must overcome their scientific incompetence as best they can.” Id. Ill-fitted though it is, the Court will attempt to resolve the issues presented.

At the outset, the Court notes the Federal Circuit has recently called into question the legal standard governing inequitable conduct claims. See Therasense, Inc. v. Becton, Dickinson and Co., 2010 WL 1655391 (Fed. Cir. Apr. 26, 2010) (per curiam) (granting rehearing en banc regarding the

current framework for determining materiality and intent). The Court thus defers ruling on the parties' motions regarding both RPI's inequitable conduct and fraud claims until the Federal Circuit resolves this legal uncertainty.

A. Infringement

Adjudication of patent infringement requires a two-step process: (1) the court must construe the disputed claim terms to determine the scope and meaning of the claims alleged to be infringed; and (2) the court must apply the construed claims to the accused product and process. Cybor Corp. v. FAS Technologies, Inc., 138 F.3d 1448, 1454 (Fed. Cir. 1998) (en banc). The court has already construed and clarified the disputed claim terms and phrases in its orders dated October 10, 2008 (Doc. No. 107); January 7, 2009 (Doc. No. 121); and August 7, 2009 (Doc. No. 187). The Court now attends to the second endeavor of determining whether the claims, as construed by the Court, embody the accused product and process.

1. Standard for patent infringement

In order to prove patent infringement, the patentee must "prove that the accused device embodies every limitation in the claim, either literally, or by a substantial equivalent." Zelinski v. Brunswick Corp., 185 F.3d 1311, 1316 (Fed. Cir. 1999). Literal infringement occurs when every limitation recited in the claim is found in the accused device so that the claims read on the device exactly. Amhil Enterprises Ltd. v. Wawa, Inc., 81 F.3d 1554, 1562 (Fed. Cir. 1996).

Even where an accused product or process does not literally infringe, however, a patentee may still prove infringement under the doctrine of equivalents. Under the doctrine of equivalents, a product or process that does not literally infringe each element of a patent claim may still infringe if each and every limitation of the claim is literally or equivalently present in the accused product or process. Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co., 520 U.S. 17, 40 (1997). The

doctrine of equivalents is applied to individual claim limitations, rather than to an invention as a whole. K-2 Corp. v. Salomon S.A., 191 F.3d 1356, 1367 (Fed. Cir. 1999). Consequently, “the doctrine of equivalents cannot be used to vitiate an element from the claim in its entirety.” Id.

Depending on the facts of a case, courts apply one of two tests to determine equivalence. Warner-Jenkinson, 520 U.S. at 39-40 (noting regardless of the test applied, the central inquiry is whether “the accused product or process contain[s] elements identical or equivalent to each claimed element of the patented invention”). First, under the insubstantial differences test, “[a]n element in the accused device is equivalent to a claim limitation if the only differences between the two are insubstantial.” Voda v. Cordis Corp., 536 F.3d 1311, 1326 (Fed. Cir. 2008) (quoting Honeywell Int’l Inc. v. Hamilton Sundstrand Corp., 370 F.3d 1131, 1139 (Fed. Cir. 2004)). Alternatively, the function-way-result test defines equivalence as where “an element in the accused device . . . ‘performs substantially the same function in substantially the same way to obtain substantially the same result’” as the claim limitation. Id. (quoting Schoell v. Regal Marine Industries, Inc., 247 F.3d 1202, 1209-10 (Fed. Cir. 2001)).

“Summary judgment on the issue of infringement is proper when no reasonable jury could find that every limitation recited in a properly construed claim either is or is not found in the accused device either literally or under the doctrine of equivalents.” PC Connector Solutions LLC v. SmartDisk Corp., 406 F.3d 1359, 1364 (Fed. Cir. 2005).

2. Claim 1

a. providing a “body of metal”

The Court has construed and twice clarified for the parties the term “body of metal.” Under the Court’s final construction of the term, a “body of metal” is “a collection of particles of metal into an amount,” which includes only metal particles. (Doc. Nos. 121 at 6; 187 at 2).

i. literal infringement

The Court finds that BOS 100® does not literally infringe; it is simply not a body of metal under the Court's construction of that term. There is no dispute regarding the basic composition of BOS 100®. It is a combination of granular activated carbon and elemental iron. Adventus seeks that the Court further clarify its construction of the term "body of metal," suggesting the Court, in stating that a body of metal includes only metal particles, was simply pointing out the tautology that "Metal is Metal," and when underground the metal may be accompanied by or in the presence of other material. The question as to literal infringement, however, is not what material may accompany the body of metal when it is placed underground, but what material comprises the actual body of metal as that term is construed. The Court declines to revisit the matter for what would be the third time, as its construction of the term is sufficiently clear. BOS 100®, being composed of both carbon and metal, does not literally infringe the "body of metal" limitation of Claim 1.

ii. doctrine of equivalents

Yet while BOS 100® does not literally infringe the "body of metal" limitation, it may serve as the limitation's equivalent. Adventus argues this point, *inter alia*, by way of the function-way-result test. It contends BOS 100® is the equivalent of the '213 patent's "body of metal" because BOS 100® "does substantially the same thing (provides a treatment filter, barrier or wall) in substantially the same way (*in situ*, away from atmospheric oxygen) to achieve substantially the same result (reactive contact of iron with the contaminant of contaminated groundwater)." (Doc. No. 200 at 38). RPI's arguments that BOS 100® is not equivalent to a "body of metal" center around the carbonic nature of BOS 100®, which it alleges creates a substantial difference. RPI insists the Background section of the '213 patent specifically disclaims any use of carbon, and thus that any equivalent to a "body of metal" cannot contain carbon. RPI further argues that because

BOS 100® is made up of 90-95% carbon and only 5-10% iron, it has a substantially different character than a “body of metal.” In addition, RPI contends that BOS 100® works in a very different way than the ‘213 patent’s “body of metal”: the carbon of BOS 100® absorbs contaminants from water before the iron reacts with those contaminants, while the ‘213 patent’s “body of metal” reacts with contaminants when contaminated groundwater simply passes through the treatment filter.

RPI contends the Background section of the ‘213 patent specifically disclaims any use of carbon. It argues that as a result, any equivalent to a “body of metal” cannot contain carbon. If Adventus has disclaimed all uses of carbon, then RPI may have a good argument. Cf. Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 535 U.S. 722, 741 (2002) (holding under prosecution history estoppel that narrowing amendments in patent’s prosecution history may have surrendered particular equivalents at issue). The relevant portion of the Background states:

The conventional procedures for cleaning groundwater that has been contaminated with such chlorinated solvents have generally not involved the chemical breakdown of the contaminant, but have merely removed the contaminant from the water. For example, it is known to pass the water over activated carbon, whereby the contaminants are adsorbed onto the carbon. Whilst this is effective to clean the water, the contaminants remain on the carbon: this creates in turn another disposal problem.

(Doc. No. 1-1 at 5). This language does not disclaim the use of carbon altogether. Rather, it uses the term “merely” in describing the limitations of using carbon alone. The Court reads this statement as saying carbon alone “merely” removes contaminants from water without breaking them down, which “creates . . . [a] disposal problem.” It does not disclaim the use of carbon in combination with metals that would negate the noted disposal problem. Such a reading would render the paragraph meaningless. The Background does not disclaim all uses of carbon, and “body of metal” equivalents are thus not limited to products without carbon.

RPI argues that BOS 100® has a substantially different character than a “body of metal.” BOS 100® is 90-95% carbon and 5-10% iron. Further, through a heating process, the iron becomes embedded into the pores of the carbon. RPI maintains that the small amount of iron along with the way it is embedded into the pores of the carbon represent a highly substantial difference from a “body of metal.” The Court does not agree. The active ingredient in BOS 100® is iron, rather than carbon. Iron is the same reactive element as the ‘213 patent’s “body of metal.” Simply by embedding what may be a lesser amount of iron into a much larger amount of absorbent material does not change that reactive element’s character. The difference in character between BOS 100® and a “body of metal” is insubstantial.

RPI further maintains that BOS 100® operates in a discrete manner from that of the ‘213 patent’s “body of metal.” It points out that BOS 100®’s carbon absorbs contaminants from water before its iron reacts with those contaminants, while the ‘213 patent’s “body of metal” reacts with contaminants when contaminated groundwater simply passes through the treatment filter. The Court fails to see a substantial difference here. The composition of BOS 100® certainly changes the manner in which contaminants are presented to the iron. But it does not change the key reaction: the use of iron to break down contaminants. Whether BOS 100® is more efficient than the ‘213 patent’s “body of metal” is tangential to the inquiry. Without iron, BOS 100® would be nothing more than granular activated carbon alone, which would not break down the contaminants.

The Court thus finds that, while BOS 100® is not a literal “body of metal,” no reasonable jury could find that the difference is anything but insubstantial. See Voda, 536 F.3d at 1311. Simply adding carbon to the equation does not change the reality that RPI uses iron as its active ingredient, and that the iron is what breaks down the contaminants. Likewise, no reasonable jury could find that BOS 100® is not equivalent to a “body of metal” under the function-way-result test.

See id. BOS 100® performs substantially the same function as the ‘213 patent’s “body of metal” – using iron to break down contaminants in groundwater. It performs that function in substantially the same way – by chemical reaction between the iron and the contaminants. And it obtains substantially the same result – the breakdown of harmful compounds, leaving largely uncontaminated water. That the contaminants may be absorbed from the water into the carbon before being broken down by the iron does not avoid the “body of metal” limitation. As a result, the Court determines that no reasonable jury could find BOS 100® is not equivalent to a “body of metal.”

b. covering the body of metal in such a manner . . .

Claim 1’s next limitation describes “covering the body of metal in such a manner as to prevent substantially all traces of oxygen from reaching an anaerobic portion of the body of metal.” (Doc. No. 1-1 at 7). The Court has construed the phrase “anaerobic portion of the body of metal” as meaning the “portion that will not rust.” (Doc. No 107 at 3). The Court noted in a Markman ruling that the “covering” of the body of metal acts as a sealing function. It further recognized:

The covering of the body of metal can occur in different ways depending on the embodiment used. The body of metal can be covered by soil in the trench embodiment or by a roof in the pond embodiment, or by allowing the top of the body of metal to rust which acts as a seal.

(Id.).

RPI argues on two fronts regarding this limitation. It first contends that because BOS 100® is injected into the ground, there is no act of covering it. Second, RPI maintains that the method of using BOS 100® results in adding oxygen so that there is not an anaerobic portion of the BOS 100®. Adventus argues that merely by injecting BOS 100® into the ground, RPI does not avoid “covering” the BOS 100® with soil. In addition, Adventus refutes RPI’s oxygen argument by

explaining that BOS 100® would not work if there were no anaerobic portion of it.

When the Court listed the ways in which a body of metal may be “covered” under the Claim 1 of the ‘213 patent, it did not set out to create an exhaustive list. While soil or other material is not actively poured over BOS 100® during its application, the BOS 100® certainly becomes covered with soil or whatever material comprises the aquifer into which it is injected. Injecting the BOS 100® into the ground leads to its becoming covered with the material of the aquifer. Stated another way, the method of applying BOS 100® covers it with the material of an aquifer by injecting it beneath layers of the aquifer. RPI’s argument to the contrary is no more than semantics. The method of applying BOS 100® involves “covering” it.²

The question then becomes whether, in applying BOS 100®, there is an “anaerobic portion” of it. Such a portion would be that which does not rust, as the Court has construed the term.

RPI argues that when BOS 100® is mixed with water in an above-ground tank, the process results in dissolving atmospheric oxygen into the mixture. RPI’s expert Noland explains that the activated carbon in the BOS 100® adsorbs some of the dissolved oxygen, thus concluding that the conditions under which BOS 100® operates are oxidizing. As he suggests, “there will be oxygen inside the grain of activated carbon in the pore network.” (Doc. No. 166-3 at 10). He further states that he is unsure that it matters whether conditions are oxidizing or reducing in order for iron to degrade chlorinated solvents underground. (Doc. No. 166-3 at 8).

RPI’s independent expert Hilger, however, has observed that “BOS 100® has millions of microsites, so that even if oxygen is present in the bulk liquid, many of the interstices of the

² Even if this inverse type of covering method were found not to literally infringe, the Court finds under either the insubstantial difference or function-way-result test, it is the equivalent of the ‘213 patent’s covering limitation.

adsorbent will remain anaerobic.” (Doc. No. 195-15 at 30). Hilger further admits “[a]lthough some of the BOS 100® iron is rusted, there will be many interstices with iron that is not rusted and not exposed to oxygen” (Doc. No. 195-15 at 30). This admission comes in addition to RPI’s expert Warner, who states that “the soil above the seams of BOS 100® serves to prevent contact with atmospheric oxygen.” (Doc. No. 195-16 at 43). From RPI’s own independent experts, it is clear that while there may be some dissolved oxygen present in a BOS 100® slurry, there is a portion of iron in the mixture that will not rust. This portion is an anaerobic portion of the BOS 100® as the Court has construed the term.

The Court thus finds no reasonable jury could conclude that the method of applying BOS 100® does not involve “covering the [BOS 100®] in such a manner as to prevent substantially all traces of oxygen from reaching an anaerobic portion of the [BOS 100®]” either literally or under the doctrine of equivalents.

c. providing the metal in the form of a body of particulates . . .

The next element states, “providing the metal in the form of a body of particulates, cutting, or fibres” RPI contends that the metal in the BOS 100® is not “in the form of particulates, cutting, or fibres” It argues the iron in BOS 100® is “submicroscopic,” rather than in particulate, cutting, or fiber form. Adventus maintains that the iron in BOS 100® is in the form of particles and falls within this element of Claim 1.

The parties did not disagree about or stipulate to the definitions of “particulates, cutting, or fibres” for Markman purposes. Adventus equates the term “particulates” with the term “particles”

in arguing that the elemental iron embedded in BOS 100® is in the form of particles.³ RPI argues that particles are different from particulates, and that regardless, the iron in BOS 100® is in the form of “submicron diameter clusters,” “microscopic clusters of iron atoms,” “iron molecules,” or “microscopic deposits of metallic iron.” Adventus points out that RPI is inconsistent with its characterization of the form of iron.

RPI points out that Adventus admits in its own press release that the ‘213 patent “may not apply” to certain “nano-scale iron-based materials” (Doc. No. 166-16 at 2). However, this same release offers only one example of non-infringing material: “nanometer-sized, often bimetallic particles that continue to move advectively with groundwater after injection” (*Id.*). The elemental iron embedded in BOS 100® does not continue to move with the groundwater; it remains in place within the GAC. Thus the press release does not admit to non-infringement.

The term “particulate” is defined differently in various sources. Merriam-Webster defines the noun particulate as “a particulate substance,” and the adjective particulate as “of or relating to minute separate particles.”⁴ Combining these definitions would make particulate “a substance of or relating to minute separate particles.” The Oxford English Dictionary defines the noun particulate as “a particulate substance,” and the adjective as “1. Existing in the form of minute separate particles; composed of such particles.”⁵ Under either of these definitions, the definition of “particle” becomes key, contrary to RPI’s insinuation that it is irrelevant. The Oxford English Dictionary

³ Adventus also offers results of a test purportedly conducted by the North Carolina State’s Analytical Instrumentation Facility. However, this document is unsupported by a declaration or affidavit of the person who performed the analysis, and the Court will not consider this evidence. *See Orsi v. Kirkwood*, 999 F.2d 86, 92 (“It is well established that unsworn, unauthenticated documents cannot be considered on a motion for summary judgment.”).

⁴ <http://www.merriam-webster.com/dictionary/particulate>.

⁵ http://dictionary.oed.com/cgi/findword?query_type=word&queryword=particulate.

defines particle as “I. A small quantity of matter. 1. a. A minute fragment or quantity of matter; the smallest perceptible or discernible part of an aggregation or mass; (formerly often) an atom or molecule . . . 3. *Physics*. Any of numerous constituents of the physical world that are smaller than an atomic nucleus, such as protons, electrons, neutrinos, and quarks.”⁶

It is clear the definition of “particulate,” as informed by the definition of “particle,” encompasses the iron in BOS 100® no matter what phrase is used to describe it. Whether tagged as “submicron diameter clusters,” “microscopic clusters of iron atoms,” or any other small-sounding label, the Court finds no reasonable jury could conclude that the iron in BOS 100® is not “particulate” under this element of Claim 1. Further, because the Court has already concluded BOS 100® is equivalent to a body of metal, this element may be satisfied if BOS 100® as a whole – including both the GAC and the iron – is a particulate. The Court finds that whether one considers only the iron or the BOS 100® as a whole, there is no genuine issue for trial. The Court will grant Adventus’s motion and deny RPI’s motion on this element.

d. of such consistency that the body is permeable . . .

The next limitation describes that the body of metal is “of such consistency that the body is permeable to the flow of the groundwater through the body.” The Court has construed this phrase to mean the body of metal is “of such consistency that the groundwater can pass through the metal particles.” (Doc. No. 107 at 4).

RPI argues that groundwater cannot pass through the iron in BOS 100® because the iron is impregnated into the GAC. RPI also seems to argue that the Court’s construction requires water to physically penetrate iron, rather than pass through a collection of metal particles, which make up

⁶ http://dictionary.oed.com/cgi/findword?query_type=word&queryword=particle.

a body of metal. Adventus argues correctly that the Court simply meant the contaminated groundwater is required to flow through the collection of metal particles, rather than through individual metal particles. The Court having previously found BOS 100® is equivalent to a body of metal, the mere fact that groundwater can pass through a collection of BOS 100® granules is enough to meet this limitation. However, even if the Court isolates the inquiry to the embedded iron alone, the collection of iron particles still allows groundwater to pass through it. Thus both the BOS 100® and its embedded iron are permeable to the flow of groundwater, and no reasonable jury could find differently. Because there is no genuine issue for trial, the Court will grant Adventus's motion and deny RPI's motion as to this limitation.

e. conducting the said contaminated groundwater . . .

Claim 1's next element states: "conducting the said contaminated groundwater from its native aquifer into and through the body of metal." The Court has construed "conducting" as "passing through" which can be achieved actively or passively. (Doc. No. 107 at 4).

Adventus argues "the installations of Plaintiff's treatment material rely on groundwater to bring the contaminant to and through the body of metal, just as contemplated by the '213 patent." (Doc. No. 200 at 44). RPI contends that since BOS 100® is injected into an aquifer containing the contaminated groundwater, the groundwater is not conducted "from its native aquifer into and through the body of metal."

The Court fails to see a difference between the BOS 100® method and this limitation of the '213 patent. Whether a body of metal is injected directly into an aquifer (in discrete horizontal layers or otherwise) or placed in a trench or other embodiment adjacent to the aquifer, the groundwater must be conducted from the aquifer and into and through the body of metal. Unless the injected body of metal (or BOS 100® in this case) were to somehow completely amalgamate

with the material of the native aquifer, the groundwater must leave the aquifer in order to move “into and through the body of metal” (or a portion of the body of metal in the case of a discrete horizontal layer). It is of no significance that in the BOS 100® application, once the groundwater moves through the body of metal, it then may enter another portion of the native aquifer. The groundwater has still been conducted “from its native aquifer into and through the body of metal.” Because there is no genuine issue of material fact, the Court will grant Adventus’s motion and deny RPI’s motion as to this claim limitation.

f. so conducting the groundwater from its native aquifer . . .

Claim 1 contains the further limitation of “so conducting the groundwater from the native aquifer into the body of metal that the groundwater substantially does not come into contact with atmospheric oxygen prior to entering the anaerobic portion of the body of metal.” The Court has already determined that the “body of metal,” “conducting,” and “anaerobic portion” limitations are met. Further, the Court has noted that RPI’s own expert has acknowledged “the soil above the seams of BOS 100® serves to prevent contact with atmospheric oxygen.” (Doc. No. 195-16 at 43). Therefore, there is no genuine issue of material fact as to this claim limitation, and the Court will grant Adventus’s motion and deny RPI’s motion regarding this issue.

g. causing the groundwater to percolate . . .

The final element of Claim 1 states: “causing the groundwater to percolate through the said anaerobic portion, and to remain in contact with the metal therein, for a substantial period of time.” For Markman purposes, the Court determined “percolate” means “flow” and found that “for a substantial period of time” is not limited to one or two days. The Court further noted that the period of time necessary for the groundwater to remain in contact with the metal depends on the reactivity of the metal used, and that the “one or two days” mentioned in the specification may

be preferred under certain circumstances but does not restrict this limitation to such a time period. (Doc. No. 107 at 4-5).

i. literal infringement

RPI contends in essence that the groundwater does not percolate, or flow, through the anaerobic portion of BOS 100®. Rather, it maintains through its expert Noland's testimony that the groundwater flows among the granules of BOS 100®, and the GAC absorbs the contaminants out of the water and into the pores of the GAC. From there, RPI argues that the embedded iron breaks down the contaminants that have already been absorbed into the carbon, without the groundwater actually flowing through the anaerobic portion (the unrusted iron). Adventus, however, offers no evidence to refute Noland's assertions and fails to distinguish between (1) groundwater and (2) the contaminants that are allegedly absorbed from the groundwater in the application of BOS 100®.

Thus the Court accepts Noland's expert opinion as true in analyzing whether RPI infringes this limitation for summary judgment purposes. See Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 256-57 (1986) (holding the nonmoving party must present affirmative evidence in order to defeat a properly supported motion for summary judgment). And so the Court must accept that when BOS 100® is applied, the groundwater itself does not reach the anaerobic portion of the iron, but rather the contaminants in the groundwater are absorbed from out of the water before coming into contact with the anaerobic portion. On these facts, no reasonable jury could find that groundwater literally percolates "through the anaerobic portion," because the groundwater never reaches that portion.

ii. doctrine of equivalents

Whether RPI infringes this limitation under the doctrine of equivalents is another question. Under the function-way-result test, Noland's description of the process is not the equivalent of this limitation. It employs substantially the same function – bringing contaminants from groundwater

into contact with iron. But it does not act in substantially the same way – the ‘213 patent describes the groundwater percolating through the anaerobic portion of a body of metal, while the BOS 100® method, according to Noland, involves carbon absorbing the contaminants from groundwater without the groundwater reaching the anaerobic portion of iron.

However, there may be an insubstantial difference between RPI’s method and this limitation. The Court finds from the minimal evidence presented on this point that there is a genuine issue of fact as to this question. See Upjohn Co. v. Mova Pharmaceutical Corp., 225 F.3d 1306, 1309 (Fed. Cir. 2000) (“The determination of equivalency is a question of fact”) (citation omitted). Does the fact, for summary judgment purposes, that contaminants in the BOS 100® application are extracted from the groundwater before reaching the anaerobic portion of metal create a substantial difference from this element of Claim 1? There is a genuine issue of fact as to whether RPI infringes this limitation under the insubstantial difference test. The parties will be able to develop this issue at trial.

3. Claim 3

The parties also contest whether RPI infringes Claim 3 of the ‘213 patent.⁷ The Court has construed dependent Claim 3 to add limitations to the steps of Claim 1 from which it depends. Claim 3 states:

Procedure of claim 1, further comprising the steps: of excavating a trench in the material of the aquifer, in the path of the contaminated groundwater; of placing the said body of metal in the trench; wherein the dimensions of, and disposition of, the

⁷ RPI also states in its motion that it seeks summary judgment regarding the issue of infringement of Claim 2 of the ‘213 patent, but it does not argue the matter. Adventus did not move for summary judgment as to the alleged infringement of Claim 2. The Court thus does not address Claim 2 of the ‘213 patent.

trench and of the said anaerobic portion are such that the contaminated groundwater passes through the said anaerobic portion.

(Doc. No. 1-1 at 8). The Court has already determined there is no genuine issue of fact regarding the “body of metal” and “anaerobic portion” limitations of Claim 1. However, the Court found genuine issues of material fact exist regarding whether groundwater passes through an anaerobic portion of the iron in BOS 100® under the “insubstantial difference” test of the doctrine of equivalents. So here, the same jury question remains: whether “the contaminated groundwater passes through the said anaerobic portion.”

Further, there may be an issue of fact regarding Claim 3’s “trench” limitation. The Court has construed the term “a trench” “to embody ‘a single trench’ that is placed in the path of the plume that is filled with the body of metal which can consist of mixtures of metal and aquifer sand, gravel, and other materials.” (Doc. No. 107 at 5). The Court later clarified on a motion to reconsider that “[t]o the extent that the term trench must be reconsidered, the Court construes the term ‘trench’ as a ‘single trench.’” (Doc. No. 121 at 5).

RPI admits that on one project, a small amount of BOS 100® was placed in a trench as required by Claim 3. RPI claims, however, that it did not recommend using the BOS 100® in such a manner. Rather, RPI contends it does not advertise or market the use of BOS 100® in a trench. RPI is not liable for direct infringement of Claim 3 unless it directly performed each step of Claim 3 in this instance, or at least exercised control or direction over the customer in its use of the trench. See Muniauction, Inc. v. Thomson Corp., 532 F.3d 1318, 1329 (Fed. Cir. 2008) (“[M]ere ‘arms-length cooperation’ will not give rise to direct infringement by any party.”).

Adventus points to an email exchange between RPI’s principal Noland and the customer who used BOS 100® in a trench. There, Noland set forth multiple options for the product’s application,

in the end stating:

[I]t seems the most cost effective way to perform the installation is to simply mix the product into the native formation. A swath could be cleared (perhaps 6 feet wide and the top 1 to 2 feet of soil and asphalt removed[]). The BOS 100 could be completely saturated and then poured (wet) into the depression and mixed into the saturated sands/gravels down to bedrock. The overburden would then be replaced, compacted and any asphalt removed could be replaced.

(Doc. No. 195-17 at 11). RPI offers testimony from Noland that RPI recommended the customer either inject the BOS 100® directly into the contaminated groundwater or mix it directly into the contaminated soil and contaminated groundwater, but that instead, the customer excavated a trench, mixed the BOS 100® with pea gravel, and placed the mixture into the trench.

While Noland's email recommendation may strike the Court as describing a trench, a genuine issue of material fact exists. A reasonable jury could find that the email describes something other than the trench limitation of Claim 3.

Because genuine issues of fact remain whether (1) "the contaminated groundwater passes through the said anaerobic portion" and (2) whether RPI infringed the trench limitation, the Court will deny the parties' motions as to Claim 3.

4. Claim 6

The final contested claim of the '213 patent is Claim 6. Claim 6 describes the boreholes embodiment. Claim 6 states:

Procedure of claim 1, further comprising the steps: of providing a series of boreholes in the material of the aquifer, in the path of the contaminated groundwater; of injecting metal into the boreholes; wherein the spacing of the boreholes, and the quantity of metal injected, in relation to the material of the aquifer, are such that the injected metal penetrates into the material to a sufficient extent as to form the said body of metal, and the said anaerobic portion thereof.

(Doc. No. 1-1 at 8). The Court construed the disputed terms of Claim 6 as "a collection of metal particles that is injected into the boreholes in such a way that consists of a continuous wall of filings

that is not exposed to atmospheric oxygen in a manner that would cause rust.” (Doc. No. 107 at 5-6).

RPI provides expert testimony that the “direct push” method of injection differs from the “drill and jet” process described in Claim 6. RPI provides further expert testimony that its method of injecting BOS 100® does not create a “continuous wall,” which the Court has construed Claim 6 to describe. Adventus, on the other hand, contends there is little difference between “drill and jet,” “direct push,” and horizontal “hydraulic fracturing,” and that Claim 6 covers each of these methods of injecting metal particles into boreholes.

There is a genuine issue of fact regarding whether the method of applying BOS 100® creates a continuous wall. RPI provides expert testimony that, “[g]iven the way the material is installed, it’s completely unrealistic to think” a continuous wall is created. (Doc. No. 148-34 at 62). Adventus points to, among other items, RPI’s use of the terms “filter,” “barrier,” and “wall” to describe the embodiment of its treatment material. Adventus also notes RPI has told customers it provides coverage “throughout the vertical distribution.” (Doc. No. 200 at 52). A reasonable jury could find for either party on this issue. The Court will thus deny both parties’ motions as to Claim 6.

B. Validity under 35 U.S.C. § 112

RPI alleges the claims of the ‘213 patent, if construed broadly enough to cover the use of BOS 100®, are invalid under 35 U.S.C. § 112, ¶ 1. Adventus has moved for summary judgment on this claim.

35 United States Code, Section 112, states in pertinent part:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it

is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

35 U.S.C. § 112, ¶ 1 (2006).

“Whether a claim satisfies the enablement requirement of 35 U.S.C. § 112 is a question of law, . . . based on underlying facts” Sitrick v. Dreamworks, LLC, 516 F.3d 993, 999 (Fed. Cir. 2008). First, a patent’s specification “must describe the manner and process of making and using the invention so as to enable a person of skill in the art to make and use the full scope of the invention without undue experimentation.” LizardTech, Inc. v. Earth Resource Mapping, Inc., 424 F.3d 1336, 1344-45 (Fed. Cir. 2005). Second, the specification must “describe the invention sufficiently to convey to a person of skill in the art that the patentee had possession of the claimed invention at the time of the application, i.e., that the patentee invented what is claimed.” Id. And while case law requires a two-part inquiry, “[t]hose two requirements usually rise and fall together.” Id. at 1345. However, as Federal Circuit case law makes clear, “a patentee need not describe in the specification every conceivable and possible future embodiment of his invention.” CCS Fitness, Inc. v. Brunswick Corp., 288 F.3d 1359, 1366 (Fed. Cir. 1997) (internal quotation marks and citation omitted).

That is because the patent specification is written for a person of skill in the art, and such a person comes to the patent with the knowledge of what has come before. Placed in that context, it is unnecessary to spell out every detail of the invention in the specification; only enough must be included to convince a person of skill in the art that the inventor possessed the invention and to enable such a person to make and use the invention without undue experimentation.

Falko-Gunter Falkner v. Inglis, 448 F.3d 1357, 1366 (Fed. Cir. 2006) (citation omitted). Still, “[t]he scope of the claims must be less than or equal to the scope of enablement’ to ‘ensure[] that the public knowledge is enriched by the patent specification to a degree at least commensurate with the scope of the claims.’” Sitrick, 516 F.3d at 999 (quoting Nat’l Recovery Techs., Inc. v. Magnetic

Separation Sys., Inc., 166 F.3d 1190, 1195-96 (Fec. Cir. 1999)).

RPI in essence asserts if any of the claims of the ‘213 patent are construed to cover BOS 100® or its method of use, those claims are invalid because the specification does not enable a person of skill in the art to make BOS 100® and use it as RPI recommends. RPI contends the ‘213 patent specification does not disclose or suggest using anything other than “bulk filler material” in addition to iron, and that it does not broadly disclose mixing iron with other materials such as activated carbon. The Court has already found that the ‘213 patent’s Background section does not disclaim the use of carbon in tandem with iron, but rather the use of carbon alone. Yet the specification certainly does not explicitly endorse the use of carbon either. Unlike § 112, however, RPI’s assertion focuses on the relationship among a patent’s specification, its claims, and the alleged infringing method or device. Section 112, ¶ 1 focuses, at least textually, only on the relationship between a patent’s specification and its own claims.

RPI points to the LizardTech case in support of its position. 424 F.3d at 1344-46. In LizardTech, the patent’s specification described a single specific means of creating a seamless discrete wavelet transform (“DWT”) of a digital image. Id. at 1344. One claim of the patent, however, involved a generic statement including any means of creating seamless DWTs. Id. The court held that the patentee’s description of one particular method did not enable its generic claim to “any and all means for achieving that objective.” Id. at 1346. RPI also cites Tronzo v. Biomet, Inc. as supporting its contentions. 156 F.3d 1154 (Fed. Cir. 1998). There, a patent claimed an artificial hip socket with generic-shaped cup implants, while the specification focused only on conical-shaped cup implants. Id. at 1159. The court held the specification failed to enable the full scope of the patent’s generic claims. Id. at 1160.

These cases are not on all fours with the case at hand. Both LizardTech and Tronzo involved specific written descriptions that failed to enable generic claim language. Here, RPI points to no generic claim language of the ‘213 patent. Instead, RPI rests on a rudimentary notion that if RPI has infringed, then there is no way the specification enables the patent’s claims, because the specification does not enable BOS 100® or its method of use.

Other cases have considered scenarios where a patent’s non-generic claim language goes beyond the scope of the specification. For instance, in Sitrick v. Dreamworks, LLC, a patent specifically claimed a method for integrating a user’s audio signal or video image into a pre-existing video game or movie. 516 F.3d at 995. The Federal Circuit held the patent was invalid under § 112 because the specification only enabled the scope of claims to include video games, but not movies. Id. Similarly, in Automotive Technologies International, Inc. v. BMW of North America, Inc., a patent involved crash-sensing devices for triggering the deployment of airbags during side-impact vehicle collisions. 501 F.3d 1274, 1277 (Fed. Cir. 2007). The patentee “vigorously advocated” for and obtained a broad claim construction that included both mechanical and electrical side impact sensors. Id. at 1280. The Federal Circuit held these broadly construed claims invalid under § 112 because the specification only enabled the claim for a mechanical sensor, and not for an electrical one. Id. at 1284.

Unlike the Sitrick and BMW cases, however, the specific claims of the ‘213 patent as construed by the Court simply do not go beyond the scope of what the specification enables. RPI fails to point out a specific claim or limitation that lies beyond the scope of the ‘213 patent’s specification. Rather than focusing on the Court’s construction of the claims as what the specification must enable, see BMW, 501 F.3d at 1280, RPI focuses on the end possibility of infringement of the construed claims. However, infringement is a separate question, going a step

beyond the § 112 inquiry. See CFMT, Inc. v. YieldUP Int'l Corp., 349 F.3d 1333, 1339 (Fed. Cir. 2003) ([T]his court gauges enablement at the date of the filing, not in light of later developments.”) (citation omitted). This difference is especially magnified when considering the application of the doctrine of equivalents to infringement analysis. A discussion, albeit in a different context, of the doctrine of equivalents sheds light on this question. As the Federal Circuit has explained:

The doctrine of equivalents is necessary because one cannot predict the future. Due to technological advances, a variant of an invention may be developed after the patent is granted, and that variant may constitute so insubstantial a change from what is claimed in the patent that it should be held to be an infringement. Such a variant, based on after-developed technology, could not have been disclosed in the patent.

Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc., 145 F.3d 1303, 1310 (Fed. Cir. 1998).

Where a later infringing variant “could not have been disclosed in the patent,” it would be nonsensical to invalidate the patent under § 112 for a failure of the specification to enable the patent’s claims to the extent of that variant. While the variant may still infringe the patent under the doctrine of equivalents, there is no § 112 invalidity.⁸

It is thus of no consequence that the ‘213 patent specification does not discuss using carbon or anything other than “bulk filler material.” The patent’s claims under the Court’s construction do not literally include carbon or other like materials within their scope, and the specification need not enable what the patent does not claim. The Court has simply found that the addition of carbon to the equation is an insubstantial difference under the doctrine of equivalents. Such a finding does not equate to § 112 invalidity, while it does lead to a finding of infringement on the “body of metal” limitation.

⁸ The Court has already determined that BOS 100® and its method of use do not literally infringe two elements of Claim 1, the only independent claim of the ‘213 patent. Thus the question of infringement fully depends on the application of the doctrine of equivalents.

Based on the lack of specific argument or evidence produced by RPI, the Court finds there is no genuine issue for trial as to whether RPI can prove by clear and convincing evidence that the ‘213 patent is invalid under § 112. Judgment is appropriate as a matter of law declaring the ‘213 patent’s specification (1) “enable[s] a person of skill in the art to make and use the full scope of the invention without undue experimentation”; and (2) “describe[s] the invention sufficiently to convey to a person of skill in the art that the patentee had possession of the claimed invention at the time of the application, i.e., that the patentee invented what is claimed.” LizardTech, 424 F.3d at 1344-45. The Court will thus grant Adventus’s motion for summary judgment as to § 112 validity and deny RPI’s motion as to the same issue.

C. Obviousness under 35 U.S.C. § 103

RPI seeks summary judgment that Claims 1, 3, and 6 of the ‘213 patent are invalid under 35 U.S.C. § 103 in view of prior art not considered by the Patent Examiner during prosecution of the ‘213 patent.⁹ Adventus seeks summary judgment that the ‘213 patent is valid under § 103.¹⁰

Under 35 U.S.C. § 282, issued patents carry a presumption of validity that can only be defeated by clear and convincing evidence. Medical Instrumentation & Diagnostics Corp. v. Elekta AB, 344 F.3d 1205, 1220 (Fed. Cir. 2003). “When, as here, the . . . challenge is an allegation of obviousness, the presumption is that the invention would not have been obvious.” Panduit Corp. v. Dennison Mfg. Co., 810 F.2d 1561, 1570 (Fed. Cir. 1987). Thus RPI must prove by clear and

⁹ While both parties moved for summary judgment as to Claim 2, neither party has briefed the issue, and the Court does not address this issue.

¹⁰ While Adventus stated in its motion for summary judgment on the ‘213 patent that it was seeking summary judgment as to validity under § 103, it failed to argue this point in its brief in support of the motion. See (Doc. No. 200) (mentioning in various places that the ‘213 patent is non-obvious but failing to mention or argue under § 103). Even after RPI pointed out Adventus’s failure to argue the matter, see (Doc. No. 166 at 1 n.1), Adventus did not address it, see (Doc. No. 175). Adventus’s arguments in response to RPI’s motion for summary judgment on § 103 validity cover the same area, however, and the Court will therefore accept these arguments as Adventus’s arguments in support of its motion.

convincing evidence that the invention would have been obvious in light of the undisclosed references.

Section 103 of the Patent Act provides:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

35 U.S.C. § 103(a). “The ultimate judgment of obviousness is a legal determination.” KSR Int’l v. Teleflex Inc., 550 U.S. 398, 427 (2007). However, this legal determination is based on specific factual determinations, including: (1) the scope and content of the prior art; (2) the differences between the claimed invention and the prior art; (3) the level of ordinary skill in the art; and (4) relevant secondary considerations. Graham v. John Deere Co., 383 U.S. 1, 17-18 (1966).

The secondary considerations, or “objective criteria,” of the obviousness inquiry may include: (1) whether the invention experienced commercial success; (2) whether it satisfied a long-felt, but unmet need; (3) whether it was met with skepticism from experts; (4) whether it gained the appreciation of contemporaries skilled in the field of invention; (5) whether it has been extensively copied; and (6) whether it is a product of unexpected results. See, e.g., Graham, 383 U.S. at 17-18; Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc., 520 F.3d 1358, 1365 (Fed. Cir. 2008); Vulcan Eng’g Co. v. Fata Aluminum, Inc., 278 F.3d 1366, 1373 (Fed. Cir. 2002); Pro-Mold and Tool Co., Inc. v. Great Lakes Plastics, Inc., 75 F.3d 1568, 1572 (Fed. Cir. 1996); Minn. Min. & Mfg. Co. v. Johnson & Johnson Othopaedics, Inc., 976 F.2d 1559, 1573 (Fed. Cir. 1992). “[T]his evidence is not just a cumulative or confirmatory part of the obviousness calculus but constitutes independent evidence of nonobviousness.” Ortho-McNeil, 520 F.3d at 1365. In fact, these objective

criteria “may often be the most probative and cogent evidence [of non-obviousness] in the record.” Procter & Gamble Co. v. Teva Pharmaceuticals USA, Inc., 566 F.3d 989, 998 (Fed. Cir. 2009) (quoting Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 1538 (Fed. Cir. 1983)).

Where the alleged combination of previously known elements is at issue, courts apply the Federal Circuit’s teaching, suggestion, or motivation (“TSM”) test. See Ortho-McNeil, 520 F.3d at 1365. The TSM test helps prevent against hindsight bias, allowing a determination of obviousness only where there is some teaching, suggestion, or motivation to combine the prior art. See Winner Intern. Royalty Corp. v. Wang, 202 F.3d 1340, 1348 (Fed. Cir. 2000). In KSR International Co. v. Teleflex Inc., the Supreme Court clarified that, while the TSM test provides a helpful insight, courts may only flexibly apply it rather than adhere to it as a “rigid, mandatory formula.” 550 U.S. 398, 419 (2007). Those teachings, suggestions, or motivations thus “need not always be written references but may be found within the knowledge and creativity of ordinarily skilled artisans.” Ortho-McNeil, 520 F.3d at 1365.

Generally, “[t]he scope and content of the prior art are factual questions to be determined by the jury.” Kinetic Concepts, Inc. v. Blue Sky Med. Group, Inc., 554 F.3d 1010, 1019 (Fed. Cir. 2009) (citing Graham v. John Deere Co. of Kan. City, 383 U.S. 1, 17 (1966)). However, “[w]here . . . the content of the prior art, the scope of the patent claim, and the level of ordinary skill in the art are not in material dispute, and the obviousness of the claim is apparent in light of these factors, summary judgment is appropriate.” KSR, 550 U.S. at 427.

There are genuine issues of material fact surrounding the Senzaki, McMurtry, and Thomson references. RPI’s obviousness argument relies heavily on factual determinations regarding the prior art references, including the scope, content, and teachings of Senzaki, McMurtry, and Thomson, and how one with ordinary skill in the art may have combined them. Adventus hotly contests the scope,

content, and teachings of these references, as well as what one with ordinary skill in the art would have considered.

For example, RPI argues that Senzaki teaches iron powder can eliminate halogenated hydrocarbons in waste water, especially in water lacking oxygen. RPI then points out McMurtry's disclosure that groundwater is generally anaerobic. RPI argues that one with ordinary skill in the art would have combined Senzaki and McMurtry, applying Senzaki's suggestions to an in-situ scenario. Alternatively, ETI argues that Senzaki's methods were directed to above-ground city and waste waters, and that they would not work to treat contaminated water in situ for numerous reasons.¹¹ ETI further contends that Senzaki advocated the addition of electrolytes such as sodium sulphate to contaminated water, and that Senzaki's reaction produced ferrous iron; both are allegedly undesirable contaminants in groundwater according to the defendants. ETI thus concludes that the "production of ferrous iron and addition of sulphate would lead one of ordinary skill in the art to the conclusion that in-situ applications would not be possible." (Doc. No. 161 at 18). In addition, ETI argues that one with ordinary skill in the art would not have combined Senzaki and McMurtry in applying Senzaki to groundwater, because McMurtry teaches pumping oxygen into the ground in his third example, while Senzaki teaches the value of an anaerobic environment.¹²

A jury must determine these factual questions before the Court determines the legal question of obviousness. See Kinetic Concepts, 554 F.3d at 1021 ("Defendants' obviousness argument at trial relied heavily on the prior art references, the scope and content of which are factual questions

¹¹ Dr. Gillham did admit in deposition, however, that Senzaki's reference to "underground" refers to groundwater.

¹² The Court notes that ETI has produced significant objective evidence of nonobviousness, including skepticism of experts (including Dr. Tratnyek) and commercial success, among other evidence. Standing alone, however, this objective evidence does not convince the Court that there is no genuine issue of material fact as to the factual underpinnings of the obviousness determination.

to be determined by the jury.”). Because there are genuine issues for trial regarding the factual foundation for the Court’s obviousness determination, the Court will deny both the plaintiff’s and the defendant’s motion for summary judgment regarding validity under 35 U.S.C. § 103.

D. Unfair and Deceptive Trade Practices

In its motion for partial summary judgment as to the ‘213 patent, Adventus has also moved for summary judgment on RPI’s claims for violations of the unfair trade practices statutes of both North Carolina and Colorado. RPI’s nearly identical claims under these two statutes require a choice-of-law determination. The Court hears these claims pursuant to diversity jurisdiction and thus applies the choice of law rules of North Carolina. See Klaxon Co. v. Stentor Elec. Mfg. Co., 313 U.S. 487, 496 (1941) (explaining that a court sitting in diversity applies the choice of law rules of the state in which it sits).

There exists a split of authority in North Carolina regarding which choice of law rule to apply to unfair trade practices claims. Stetser v. TAP Pharmaceutical Prods., Inc., 598 S.E.2d 570, 580 (N.C. Ct. App. 2004). This split of authority remaining unresolved, North Carolina courts at times apply both the “most significant relationship” test and the “place of injury” (or “lex loci delicti”) test. Id. The parties do not argue regarding which state’s law the Court should apply.

Regarding the place of injury, RPI claims that in January 2007, counsel for Adventus contacted at least one North Carolina company doing business with RPI and planning to use the BOS 100® product for a contaminated site that the company owns in Charlotte. RPI alleges Adventus’s counsel accused the use of BOS 100® as infringing the ‘213 or the ‘154 patent, or both, and that Adventus has demanded a royalty from the property owner for its use of BOS 100®. RPI further complains that Adventus has falsely told RPI’s North Carolina customers that they “provide the same or essentially the same product as the BOS 100® product for less money,” (Doc. No. 170

at 8), when RPI's remediation process is much faster. These allegations point toward injuries taking place to customer relationships in North Carolina. While RPI is a Colorado corporation with its principle place of business in Colorado, and the alleged financial injury may be felt in Colorado, the place of alleged injury is North Carolina. Under this test, North Carolina's unfair trade practices statute is the applicable law.

Regarding which state has the most significant relationship, RPI is a Colorado corporation with its principal place of business in Colorado. However, all the alleged unfair practices took place in North Carolina, involving RPI's actual and potential North Carolina customers and a work site in North Carolina. Based on these limited facts and no real argument from the parties, the Court finds North Carolina has the most significant relationship to this litigation.

Under either choice of law rule, North Carolina law applies to RPI's unfair trade practices claim. Therefore, the Court will dismiss the claim under the Colorado Consumer Protection Act and address only RPI's claim under the North Carolina Unfair and Deceptive Trade Practices Act ("UDTPA"), N.C. Gen. Stat. § 75-1.1.

To state a claim under § 75-1.1, a plaintiff must allege three elements: "(1) an unfair or deceptive trade practice, (2) in or affecting commerce, which (3) proximately caused actual injury to the claimant." Nucor Corp. v. Prudential Equity Group, LLC, 659 S.E.2d 483, 488 (N.C. Ct. App. 2008). "A practice is unfair if it is unethical or unscrupulous, and it is deceptive if it has a tendency to deceive." Dalton v. Camp, 548 S.E.2d 704, 711 (N.C. 2001). "The purpose of G.S. 75-1.1 is to provide a civil means to maintain ethical standards of dealings between persons engaged in business and the consuming public within this State, and [it] applies to dealings between buyers and sellers at all levels of commerce." Sara Lee Corp. v. Carter, 519 S.E.2d 308, 311 (N.C. 1999).

As the Court recognized at the motion to dismiss stage, this claim is necessarily dependent upon the validity of the two patents, which Adventus is aggressively enforcing. In fact, Adventus correctly recognized this fact in its motion to dismiss when it sought to dismiss this claim only to the extent that it relied “on the allegations contained in paragraphs 78-83 of Plaintiff’s First Amended Complaint.” (Document No. 99, p. 1). Paragraphs 78-83 comprise the Plaintiff’s “alternate” allegations regarding fraud on the PTO.

Adventus now argues that “it is unclear whether any litigant may make a claim under N.C. Gen. Stat. § 75.1.1 involving enforcement of patent rights.”¹³ (Doc. No. 195 at 58). Among other cases, Adventus cites in support of its position an unpublished Federal Circuit decision, Mirafi, Inc. v. Murphy, 928 F.2d 410 (Table), 1991 WL 10623 (Fed. Cir. Feb. 4, 1991). However, in that case the Federal Circuit explicitly held that “bad faith infringement litigation, because it is either immoral, unethical, oppressive, unscrupulous, or substantially injurious to consumers, could violate North Carolina’s Unfair Competition Statute.” Id. at *2.

Under some circumstances, a claim for inequitable conduct may support a state-law unfair competition claim. The federal circuit has held that such state-law claims are not always preempted by the patent laws. See Dow Chemical Co. v. Exxon Corp., 139 F.3d 1470 (Fed. Cir. 1998); Hunter Douglas, Inc. v. Harmonic Design, Inc., 153 F.3d 1318 (Fed. Cir. 1998). The court in Concrete Unlimited, Inc. v. Cementcraft, Inc., considered a similar claim to that of the current case. 776 F.2d 1537 (Fed. Cir. 1985). There, the court considered a state-law unfair competition claim deriving from an inequitable conduct claim where the patent holder had threatened infringement actions

¹³ Adventus also attempts in its summary judgment brief to incorporate by reference its briefs in support of its previous motion to dismiss. The parties have been granted extended page allotments for purposes of briefing the summary judgment issue, of which they have taken full advantage, and the Court will not consider the motion-to-dismiss briefs at this stage.

based on an alleged fraudulently obtained patent. As the court stated:

The district court concluded that [the patent owner's] actions during the present litigation "may be considered in regard to unfair competition" and that [the patent owner] is "guilty of acts of unfair competition by taking business away from the Defendant by threats and infringement actions based on the fraudulently obtained patent." That conclusion, asserted by [the Defendant], effectively means that [the patent holder] should not have enforced its patent rights during the course of this litigation because its patent was later held invalid.

The '028 patent carried a presumption of validity into this litigation that placed the burden of persuasion by clear and convincing evidence to the contrary upon the challenger. 35 U.S.C. § 282; SSIH Equipment, S.A. v. United States International Trade Commission, 718 F.2d 365, 375, 218 USPQ 678, 687 (Fed. Cir. 1983). [The patent owner] had the right to exclude others from making, using, and selling the invention and to enforce those rights until the '028 patent was held invalid. [It] did only what any patent owner has the right to do to enforce its patent, and that includes threatening alleged infringers with suit. See 35 U.S.C. § 281. [The patent owner's] actions in this case were not unfair competition, and we reverse the district court's holding to the contrary.

Concrete Unlimited Inc., 776 F.2d at 1539. Preemption in the Concrete Unlimited scenario exists where there is "good faith enforcement of a patent." Zenith Electronics Corp. v. Exzec, Inc., 182 F.3d 1340, 1351 (Fed. Cir. 1999) (citation omitted). However, where there is evidence of "bad faith misconduct in the marketplace," correlative state-law unfair competition claims are not preempted. See id.

Here, RPI fails to provide sufficient evidence from which a reasonable jury could find the requisite bad faith to sustain a claim under the UDTPA. While the Court defers deciding the issues of inequitable conduct and fraud, it finds no evidence suggesting Adventus believed its patent was invalid, yet still aggressively asserted it against RPI and its customers. Absent such evidence, the Court will dismiss RPI's UDTPA claim.

IV. CONCLUSION

IT IS, THEREFORE, ORDERED that:

1. RPI's motion for partial summary judgment regarding the '213 patent (Doc. No. 133) is **DENIED IN PART**, that is:
 - a. **DENIED** as to all claims other than its claims for inequitable conduct and fraud; and
 - b. the Court **DEFERS** ruling on the motions as to RPI's inequitable conduct and fraud claims until a later date; and
2. Adventus's motion for partial summary judgment regarding the '213 patent (Doc. No. 143) is **GRANTED IN PART and DENIED IN PART**, that is:
 - a. **GRANTED** as to **infringement of the following limitations of Claim 1**:
 - i. the "body of metal" limitation;
 - ii. the "covering" and "anaerobic portion" limitations;
 - iii. the "body of particulates" limitation;
 - iv. the "permeable to the flow of groundwater" limitation;
 - v. the "conducting . . . into and through the body of metal" limitation; and
 - vi. the "conducting . . . from its native aquifer" limitation;
 - b. **DENIED** as to **infringement of the following limitations of Claim 1**:
 - i. the "causing the groundwater to percolate through the said anaerobic portion" limitation;
 - c. **GRANTED** as to **infringement of the following limitations of Claim 3**:
 - i. the "body of metal" limitation; and
 - ii. the "anaerobic portion" limitation;
 - d. **DENIED** as to **infringement of the following limitations of Claim 3**:
 - i. the "passes through the . . . anaerobic portion" limitation; and
 - ii. the "trench" limitation;
 - e. **DENIED** as to **infringement of Claim 6**;
 - f. **GRANTED** as to validity under 35 U.S.C. § 112, ¶1;
 - g. **DENIED** as to validity under 35 U.S.C. § 103;
 - h. **GRANTED** as to RPI's claim for violation of the Colorado Consumer Protection Act;

- i. **GRANTED** as to RPI's claim for violation of North Carolina's Unfair and Deceptive Trade Practices Act; and
- j. the Court **DEFERS** ruling on the motions as to RPI's inequitable conduct and fraud claims until a later date.

SO ORDERED.

Signed: May 13, 2010

A handwritten signature in cursive script, reading "Robert J. Conrad, Jr.", written over a horizontal line.

Robert J. Conrad, Jr.
Chief United States District Judge

